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| EXAMINER | |
|---|---|
| LE, LANA N | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2685 | |

DATE MAILED: 06/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/807,207 | MALONE ET AL. | |
| | Examiner | Art Unit | |
| | Lana N Le | 2685 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *07 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-3,5-10 and 14-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-3,5-10,14,18 and 19* is/are allowed.

6)☒ Claim(s) *15-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *31405*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 01/21/05 with regards to claims 15-17 have been fully considered but they are not persuasive.

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Regarding claims 15-17, the claim merely claim "mixing a baseband signal with a plurality of oscillator signals with different phases in an interleaving manner", this does not have the same meaning as the newly amended claim 1, "the interleaved baseband signal is generated by selectively interchanging a routing of a plurality of baseband signals" wherein the baseband signal is interleaved separately while claims 15-16 merely claim a baseband is "mixed in an interleaving manner" and not the baseband signal itself is interleaved.

### *Drawings*

New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because there are text cut off at top, bottom, or sides of figures 5a, 5c, and fig. 6 when they are scanned and rescanning will not correct images. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The

corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Hellberg (US 6,385,439).

Regarding claim 15, Hellberg discloses a subsystem for transmitting a radio frequency signal via antenna 26 (fig. 2 and hereafter; radio frequency carrier signal; col 1, lines 4-7; col 3, lines 27-43), comprising:

means (upconverting mixer 18) for mixing a baseband signal (I, Q baseband signal; col 3, lines 44-47) with a plurality of oscillator signals (local oscillator signals from LO 20; col 4, lines 15-20) with different phases (phase shifted local oscillator signals; col 5, line 65 - col 6, line 1) in an interleaving manner (by interleaving the multiple pulsed signals generated by corresponding phase shifted local oscillator signals to switch and mix with the filtered I, Q baseband signals within mixer 18; col 5, line 60–col 6, line 12); and

means (antenna 26) for transmitting the mixed baseband signal as an RF signal (col 3, lines 33-38).

Regarding claim 16, Hellberg discloses a subsystem for transmitting a radio frequency signal via antenna 26 (fig. 2 and hereafter; radio frequency carrier signal; col 1, lines 4-7; col 3, lines 27-43), comprising:

at least one mixer (18) for mixing a baseband signal (I, Q baseband signal; col 3, lines 44-47) with a plurality of oscillator signals (local oscillator signals from LO 20; col 4, lines 15-20) with different phases (phase shifted local oscillator signals; col 5, line 65 - col 6, line 1) in an interleaving manner (by interleaving the multiple pulsed signals generated by corresponding phase shifted local oscillator signals to switch and mix with the filtered I, Q baseband signals within mixer 18; col 5, line 60 - col 6, line 12).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hellberg (US 6,385,439) in view of Takikawa (US 6,665,159).

Regarding claim 17, Hellberg discloses a transmitter (10; fig. 2; col 3, lines 38-43) comprising:

at least one mixer (18) for mixing a baseband signal (I, Q output from quadrature baseband signal generator 12; col 3, lines 44-47) with a plurality of oscillator signals (oscillator signals from LO 20) with different phases (phase shifted local oscillator signals) in an interleaving manner (by interleaving the multiple pulsed signals generated by corresponding phase shifted local oscillator signals to switch and mix with the filtered I, Q baseband signals within mixer 18; col 5, line 60–col 6, line 12).

Hellberg does not explicitly disclose the system, comprising: a mobile device in communication with a wireless communication network; wherein the device includes an integrated circuit including the at least one mixer.

Takikawa discloses a mobile device (mobile terminal device) in communication with a wireless communication network (base stations in a mobile communication system); wherein

the device (mobile terminal device) includes an integrated circuit (IC containing a transmitter/receiver line circuits) including at least one mixer 13 (col 1, lines 15-24; col 3, line 34-44). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the transmitter of Hellberg be implemented in a mobile terminal device including an integrated chip containing a transmitter section in order to have miniaturization of the components of the wireless communication mobile terminal to save space within the phone's housing for convenience to the user so he/she doesn't need to carry a bulky or heavy wireless phone as suggested by Takikawa (col 3, line 34-35).

***Allowable Subject Matter***

5. Claims 1-3, 5-10, 14, and 18-19 are allowable over the cited prior art.

6. The following is an examiner's statement of reasons for allowance:

Regarding amended independent claim 1, Hellberg and the cited prior art fail to disclose or suggest for the reason as set forth in applicant's remarks, page 14, lines 14-21 and page 11, lines 3-4.

Regarding independent claim 9, it was original objected claim 9 rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding new independent claim 18, Hellberg (US 6,385,439) discloses a method of communicating a radio frequency (RF) signal, comprising:

frequency converting (via 18; fig. 2) the first and second I, Q baseband signals (I, Q output from quadrature baseband signal generator 12; col 3, lines 44-47) to first and second RF signals, respectively, using a plurality of oscillator signals (oscillator signals from LO 20) with different phases (phase shifted local oscillator signals), the different phases of the plurality of oscillator signals based in part on an interleaving operation (by interleaving the multiple pulsed signals generated by corresponding phase shifted local oscillator signals to switch and mix with the filtered I, Q baseband signals within mixer 18; col 5, line 60–col 6, line 12) and combining the first and second RF signals before filter stage (24).

However, Hellberg and the cited prior art fail to further disclose:

a method of quadrature balancing and Local Oscillator (L0) feedthrough suppression, the method comprising:

selectively interchanging a routing of an in-phase baseband signal and a quadrature (Q) baseband signal according to an interleaving operation to generate a first interleaved I and Q baseband signal a second interleaved I and Q baseband signal;

frequency converting the first and second I, Q interleaved baseband signals to first and second RF signals, respectively, using the plurality of oscillator signals.

Regarding claim 19, Hellberg (US 6,385,439) discloses an apparatus for communicating a radio frequency (RF) signal comprising:

a first mixer (18) having a signal input coupled to the first output of a signal output (baseband signal output from filter 16), and a LO input (LO signal input from 20, 22);

a local oscillator interleaver (22) configured to receive a plurality of LO signals corresponding to a plurality of phases, and generate an interleaved LO signal that is coupled to the input of the first mixer, the first interleaved LO signal having a first phase during the first time interval and a second phase during the second time interval (col 5, line 60–col 6, line 12; col 2, lines 12-37).

Bartusiak (US 6,016,422) discloses a second mixer (358, 360) having a signal input coupled to a baseband input, signal output, and a LO input (col 8, lines 8-15; fig. 3).

However, Hellberg, Bartusiak combined and the cited prior art fail to further disclose:

an apparatus for quadrature balancing and local oscillator (LO) feedthrough suppression of a transmit signal; the apparatus comprising:

a baseband interleaver configured to receive an in-phase (I) baseband signal and a quadrature (Q) baseband signal and generate a first interleave signal at a first output by selectively routing the I baseband signal to the first output during a first time interval and selectively routing the Q baseband signal to the first output during a second interval, and generate a second interleaved signal at a second output by selectively routing the Q baseband signal to the second output during the first time interval and selectively routing the I baseband signal to the second output during the second time interval;

the local oscillator interleaver configured to generate a second interleaved LO signal that is coupled to the LO input of the second mixer, the second interleaved LO

signal having the second phase during the first time interval and the first phase during the second time interval;

the first mixer having a signal input coupled to the first output of the baseband interleaver, the signal output, and the LO input;

the second mixer having a signal input coupled to the second output of the baseband interleaver, a signal output, and a LO input;

a combiner coupled to the signal outputs of the first and second mixers.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana N Le whose telephone number is (703) 308-5836. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F Urban can be reached on (703) 305-4385. The fax phone

number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lana Le

Lana Le

June 04, 2005